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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|-------------------------|------------------|
| 10/606,104 | 06/25/2003 | Tzu-Yu Wang | H0004823 (1139.1140101) | 4209 |
| 22913 | 7590 | 12/17/2004 | EXAMINER | |
| WORKMAN NYDEGGER (F/K/A WORKMAN NYDEGGER & SEELEY) | | | NGUYEN, PHILLIP | |
| 60 EAST SOUTH TEMPLE | | | ART UNIT | |
| 1000 EAGLE GATE TOWER | | | 2828 | |
| SALT LAKE CITY, UT 84111 | | | PAPER NUMBER | |

DATE MAILED: 12/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/606,104 | WANG ET AL. | |
| | Examiner | Art Unit | |
| | Phillip Nguyen | 2828 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>11/14/03, 3/3/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 10-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 10 recites “the laser **may** have a wavelength greater than 1200 nm” which is not clear because the laser could also have a lower wavelength.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-17 and 23-30 and are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Jewell ('891).

With respect to claim 1, Jewell discloses in Figures 5D-5F and 7 a vertical cavity surface emitting laser comprising a substrate 82; a first mirror 118 situated on said substrate; an active

region 86 situated on said first mirror; a second mirror 122 situated on said active region; a first electrical contact 128 situated on said first mirror; and wherein said first mirror comprises a plurality of pairs of layers 119 and 120; and one layer 119 of at least one pair of the plurality of pair layers is an oxidized layer.

With respect to claim 2, Jewell discloses the substrate comprising InP (col. 7, lines 2-4).

With respect to claims 3 and 4, Jewell discloses the oxidized layer comprising at least one of a group comprising oxidized InAlAs, InAlGaAs, AlAs, AlGaAsSb, AlGaPSb and AlPSb and one layer of least one pair of the plurality of pairs of layers comprises InP (col. 7, lines 4-9).

With respect to claims 5-7, Jewell discloses said second mirror comprises a plurality of pairs of layers 123 and 124; and one layer of at least one pair of the plurality of pairs of layers of said second mirror comprises InP and one of a group comprising InGaAsP, InAlAs, InAlGaAs, AlAs, AlGaAsSb, AlGaPSb and AlPSb (col. 7, lines 4-9).

With respect to claims 8 and 10, Jewell discloses a vertical cavity surface emitting laser comprising first mirror 118; cavity proximate to said first mirror; and a second mirror 122 proximate to wherein said cavity and said first mirror comprises a plurality of layers; and the plurality of layers comprises at least one pair of layers having an InP layer and an oxidized layer (col. 7, lines 4-9). It is noted that the cavity is formed by first and second mirrors.

With respect to claim 9, Jewell discloses the substrate comprising InP (col. 7, lines 2-4).

With respect to claim 11, Jewell discloses the claim invention as shown in the rejection of claims 5-7.

With respect to claim 12, Jewell discloses an active layer 86 including at least one quantum well.

With respect to claim 13, Jewell discloses said second mirror comprising a partially oxidized layer for confining current because the second mirror includes a plurality of oxidized and non-oxidized layers alternating each other.

With respect to claim 14, Jewell discloses a first electrical contact 96 on said second mirror; and a second electrical contact 98 on the substrate.

With respect to claim 15, Jewell discloses an intra-cavity contact layer 146 situated between said first mirror and said cavity; first contact 96 on said second mirror; and second contact 128 on said intra-cavity contact layer.

With respect to claims 16-17, Jewell discloses in Figures 5D-5F and 7 a vertical cavity surface emitting laser comprising a substrate 82 comprising InP (col. 7, lines 2-4); a first stack of layers 118 formed on said substrate; a quantum well region 86 formed on said first stack of layers; a second stack of layers 122 formed on said quantum well region; wherein approximately every other layer of said first stack of layers is at least partially oxidized. Jewell further discloses every other layer comprising InP (col. 7, lines 4-9).

Claims 23-30 further disclose a method for making a VCSEL. Since Jewell discloses the product, it is inherent product by process for performing the method as recited in the claims.

3. Claims 16-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al. ('964). Kim discloses in Figures 1B-1C and 3 a vertical cavity surface emitting laser comprising a substrate 18 including InP, a first stack of layers 16 formed on said substrate; a quantum well region 12 formed on said first stack of layers; a second stack of layers 14 formed on said quantum well region; wherein approximately every other layer of said first stack of layers is at

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least partially oxidized; and each layer of said first and second stacks of layers has a thickness of approximately $\frac{1}{4}$ of an optical wavelength between 1200 nm-1800 nm (col. 4, lines 7-28).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. ('964) in view Jewell ('891). Kim discloses the claimed invention except for the every other layer of said first and second stacks of layers comprising a material of a group including InGaAsP, InAlAs, InAlGaAs, AlAsSb, AlGaAsSb, and AlPSb. Jewell discloses the claimed invention with the first and second stack of layers including InGaAsP, InAlAs, InAlGaAs, AlAsSb, AlGaAsSb, and AlPSb (col. 7, lines 4-9) except for the thickness of the first and second stacks of layers. For the improvement of the VCSEL, it would have been obvious to the one having ordinary skill in the art at the time the invention was made to provide the VCSEL with first and second stacks of layers made from group of those materials because it is well known in the art to use such materials for the mirror stacks.

Citation of Pertinent References

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The patent to Jewell discloses CONDUCTIVE ELEMENT WITH LATERAL OXIDATION BARRIER, U.S. Patent No. 5719891

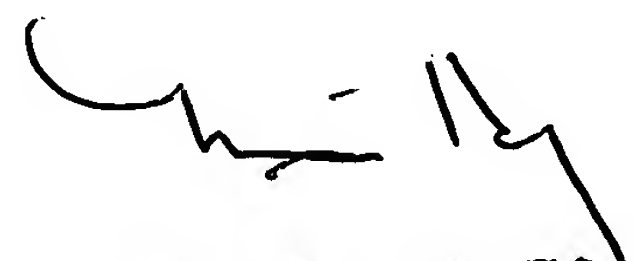
The patent to Kim discloses MOISTURE PASSIVATED PLANAR INDEX-GUIDED VCSEL, U.S. Patent No. 6680964

Communication Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip Nguyen whose telephone number is 571-272-1947. The examiner can normally be reached on 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MINSUN HARVEY, can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


MINSUN OH HARVEY
PRIMARY EXAMINER